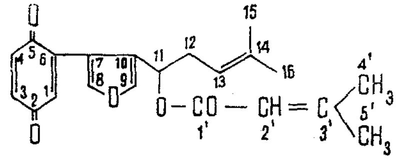
benzoquinone [3].

The two aromatic protons (7.46 and 7.52 ppm) can belong only to a symmetrically disubstituted furan ring. Thus, on the basis of the spectral characteristics and results of alkaline hydrolysis the pigment isolated may be assigned the structure (I)



However, additional information is necessary to confirm the positions of the substituents in the furan ring.

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COUMARINS AND ESTERS OF Ferula foliosa AND F. ferganensis

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We have shown the presence of four substances revealed by the diazo reagent, with R_f 0.1, 0.21, 0.42, and 0.5 (chloroform system) in the roots of Ferula foliosa Lipsky collected in the Fergana range in the valley of the river Arslanbob by chromatography on Silufol. By column chromatography on KSK silica gel with elution by hexane–ethyl acetate we isolated two substances of coumarin nature. Substance (I) $C_{24}H_{30}O_4$ (M^+ 380), mp 191-192°C, R_f 0.42. IR spectrum: ν_{max} 1710 (C=O), 1725 (C=O of an α-pyrone), 1615, 1560, 1515 cm^{-1} (aromatic nucleus). Substance (II), $C_{24}H_{32}O_4$ (M^+ 382), mp 141-142°C R_f 0.21. IR spectrum, ν_{max}, cm^{-1}: 3400-3600 (hydroxy group), 1715 (C=O of an α-pyrone), 1615, 1565, 1515 (aromatic nucleus).

The PMR spectrum of (I) had signals at 0.75 and 1.07 ppm (s, 3H, $2-\overset{|}{\underset{|}{C}}-CH_3$), 0.90 and 1.02 ppm (d, 3H each, J=7.5 Hz, $2-\overset{H}{\underset{|}{C}}-CH_3$), and 3.75 ppm (s, 2H, Ar–O–CH_2). The signals of five protons of a 7-hydroxy-substituted coumarin nucleus were observed in the 6.20-7.57 ppm region.

The PMR spectrum of (II) differed from that of (I) by the fact that it contained the signal of a hemihydroxylic proton with its center at 3.40 ppm (br. m, 1H) and the signals of the methyl groups were shifted. A comparison of the physicochemical constants and spectral (IR, NMR) characteristics showed that substance (I) was kamolone and (II) was kamolol [1, 2].

In the roots of F. ferganensis Lipsky collected in the flowering period in the same locations as F. foliosa we found three substances with R_f 0.35, 0.45, and 0.5 [petroleum ether–ethyl acetate (3 : 1) system], revealed by vanillin in sulfiric acid. Separation on a column of KSK silica gel yielded two esters: substance (I), $C_{23}H_{32}O_5$ (M^+ 388), 141-142°C, $[\alpha]_D^{20}$ −97.0° (c 1.2; chloroform), R_f 0.45; and substance (II) $C_{22}H_{30}O_4$ (M^+ 385), mp 190-191°C, $[\alpha]_D^{20}$ −91.7° (c 1.2; chloroform), R_f 0.5. Hydrolysis by heating with a 5% aqueous solution of caustic potash led to the saponification of both substances with the formation of the same sesquiterpene diol

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having the composition of $C_{15}H_{26}O_2$, mp 135-137°C, $[\alpha]_D^{20}$ −65° (c 1.0; ethanol), identical with the angrendiol described previously [3-5]. The acid fractions of the hydrolyzates of (I) and (II) yielded vanillic and p-hydroxybenzoic acids, respectively.

Thus, substance (I) is chimganidin [4] and (II) is ferolin [5] which has been isolated previously from other species of Ferula [6]. The identities of the substances were also confirmed by comparing their IR spectra and by direct mixed melting points with authentic samples.

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FLAVONOIDS OF Veronica spicata

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We have investigated the epigeal part of Veronica spicata L. (spiked speedwell), family Scrophulariaceae Lindl. collected in the flowering period in the Kungursko-Krasnoufimsk forest-steppe zone of Predural'.

By two-dimensional paper chromatography using standard color reactions, 16 substances of flavonoid nature were detected in the plant. Four substances of flavonoid nature were isolated from a methanolic extract of spiked speedwell by adsorption chromatography on a polyamide sorbent and by a preparative method. From the color of the spots on the chromatogram, and the results of qualitative reactions (Bryant's test) it was established that the substances isolated belonged to the flavone group of compounds, two of them being of glycosidic nature and two being aglycones.

Substance (I) formed a yellow powder with mp 256-258°C. The UV spectrum [λ_{max} (in ethanol) 350, 167, 255 nm] and the spectra of the substance with ionizing and complex-forming additives were identical with those of cynaroside [1, 3, 4].

On the basis of the results of spectral, chromatographic, and other investigations the glycoside isolated was identified as cynaroside (luteolin 7-O-β-D-glucoside) and its aglycone as luteolin (3',4',5,7-tetrahydroxyflavone) [1-4].

Substance (II) was identified as luteolin [1, 2, 3, 4].

Substance (III) formed a light yellow crystalline powder with mp above 300-304°C. UV spectrum, λ_{max} (in ethanol) 336, 270 nm. Acid hydrolysis gave an aglycone with mp 346-348°C which was identified as apigenin. Glucuronic acid was found in the hydrolyzate. The results of UV spectroscopy showed that the glucuronic acid was present in position 7 of the apigenin [4]. The acetyl derivative of the substance had mp 183-185°C, which corresponded to apigenin acetate [5].

From the results of chromatographic and spectral investigations in the UV region with ionizing and complex-forming reagents [1, 3] and from the absence of depressions of the melting points of mixtures with authentic samples, the glycoside isolated and its aglycone were identified as apigenin 7-β-D-glucuronide and apigenin (4',5,7-trihydroxyflavone), respectively.

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